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ABSTRACT

An experiment employed cognitive based teaching and learning procedures in an undergraduate educational psychology course. The procedures were strongly influenced by David Ausubel's theory on learning and related skills. Ausubel defines effective learning as a process by which humans understand the structure of knowledge and consciously make structures compatible with existing organization of concepts in the brain. Thus, the human nervous system, as an information processing and storing system, may be analogized to the conceptual structure of an academic discipline. An analysis of the students' conceptual structures employed in their writing established a "learning how to learn" phenomenon. There was indication of the presence of content understood and retained at a complex level, and an ability to apply concepts to practical problems. This achievement was attributed to the thesis that the students were applying learning strategies which they had extrapolated from the Ausubelian learning theory. (Author/JD)

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Learning About Learning:
The Contributions of Ausubel's Assimilation Theory to a Teacher Education Program at the University of Vermont

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ABSTRACT

This paper reports the initial results of an experiment which employed cognitive based teaching and learning procedures in an undergraduate educational psychology course at the University of Vermont. The innovations were strongly influenced by Ausubelian learning theory and related skills.

Research on outcome was conducted by using a modification of Huberman's and Matthew's content analysis techniques. The results established a "learning how to learn" phenomenon. The analysis of student's conceptual structures employed in their writing indicated the presence of content understood and retained at a complex level, and an ability to apply concepts to practical problems. This achievement was attributed to the thesis that students were applying learning strategies which they had extrapolated from Ausubelian learning theory. The strategies placed a strong emphasis on conceptual mastery, the building of conceptual structures and the consistant use of problem solving skills that required students to reorganize and rethink concepts in application.

INTRODUCTION

This paper reports the initial results of an experiment with cognitive based curriculum in an undergraduate teacher preparation program at the University of Vermont. In the fall of 1981 a two-semester course sequence (90 contact hours) was developed. The course's content and the learning process were strongly influenced by Ausubelian learning theory.[1] Using a simplified version of Johnson's model for curriculum and instruction (1967)[2], the course developed conceptual sequences, teaching processes, feedback mechanisms, and evaluation procedures which intended a high degree of conceptual mastery, integration, and application. Throughout the course a strong emphasis was placed on using the course's concepts to understand learning problems with a focus on application, creating for students a meaningful convergence between learning theory and learning practice.

[1]David Ausubel's assimilation theory has been refined and elaborated since 1963. His theories have the advantage of being intricate and comprehensive, accounting for all the cognitive, motivational, psychological and interactive variables in the learning process. (See Ausubel, 1963, 1968 and 1978; see also Novak, 1977.)

[2]Johnson's model for curriculum development and instruction is highly compatible with Ausubelian learning theory. The model places a strong emphasis on concept selection and concept organization. It makes an important distinction between curriculum and instructional issues. The model is process- and mastery-oriented, providing ample feedback that ensures accurate monitoring of actual learnings.

STUDENT ALIENATION

The Learning Studies faculty [3] developed new curriculum during the 1980 academic year in response to data that indicated problems in the then-existing undergraduate curriculum. This paper proceeeds by indicating the problem of students being alienated from theory based courses, the theory and rationales of curriculum change, and initial data on the results. During 1979-80-81 the College of Education's Center for Evaluation and Policy Research conducted an opinion survey of the school's graduates (Carlson & Davis, 1980, 1981, 1981). The report revealed that students placed a high value on student teaching internship and field practica and a low to moderate value on conceptually based courses, which included foundational courses and the learning course: Learning and Human Development. "Sixty-eight percent of the respondents participated in a student teaching experience and 90% rated it much more valuable than regular course work." After methods courses learning and human development courses were referred to as most helpful, but Learning and Human Development was mentioned by many students as least helpful.

Clearly the data from these surveys indicate the strong drive in late adolescence to derive a sense of achievement by doing (White, 1959 and Erikson, 1959). Student teaching and field experiences

[3]The Learning Studies faculty are those members of the College of Education and Social Services who are primarily responsible for teaching courses in learning and educational psychology. experiences allow undergraduates to achieve a sense of self efficacy by planning, organizing and carrying out goals to completion.

allow undergraduates to achieve a sense of self-efficacy by planning, organizing and carrying out goals to completion.

FROM EXTRANEOUS BAGGAGE TO MEANINGFUL THEORY

In addition to considering White's and Erikson's theories, the Learning Studies faculty postulated that a major factor contributing to student dissatisfaction in conceptually oriented courses was abstract and remote theory, disconnected from the realities of education as they experienced it. We thought that students were alienated from theory because it was only vaguely and superficially understood. Subsequently, theory was not being retained and was unavailable for informing , in a helpful way, the student's experience in practice. Thus, and understandably so, students considered theory courses as extraneous baggage--unnecessary to their purposes of becoming effective practitioners. They were not valuing concepts that they couldn't fully understand, nor, because of vague recall, use in practical ways.

In response to the above problem, our working premise was that courses that are based on scientific principles of learning have the opportunity to use learning theory as a mechanism for students to

learn about the nature of their learning (or learn about learning), which in turn would improve their acquisition, retention, and application of concepts. We also postulated that student attitudes toward theory and theory-related courses would improve because of the sense of competence associated with effective learning and application. (See White, 1959 on competence and motivation, and see Ausubel, et al., 1978, pp. 397-431 on cognitive drive.)

AUSUBELIAN LEARNING THEORY

Prior to 1981 the Learning Studies faculty had begun to experiment with Ausubel's theories. Our initial experience was that his concepts were helping our students learn. However, Ausubel's theories are in-depth, extensive, and even abstruse. In order for our students to master his concepts we needed plenty of time and careful attention to mastery.

David Ausubel's work (1963, 1968, 1978) represents an almost purely information processing approach to education. Ausubel uses information processing theory for explaining how subject matter is constructed and for his description of the mental processes used by students when learning.

Basically, the theory suggests that learning isolated pieces of information (rote learning) is ineffective because the human brain is not designed for retaining random information. In contrast, Ausubel defines effective learning as occurring when students understand the structure and organization of knowledge. Understanding the structure of knowledge is a process of learning concepts and the relationships between concepts forming in the mind as levels of associations

between ideas. One of Ausubel's major tenets is that academic disciplines are organized and structured with concepts in relationship to one another in hierarchical patterns. Learning, then, is a process of understanding the way humans produce knowledge (understanding the structure of knowledge) and consciously making structures compatible with existing organization of concepts in the brain. Thus the human nervous system as an information processing and storing system may be analogized to the conceptual structure of an academic discipline.

Ausubel's work can be further understood through six major concepts. Primarily, Ausubel is concerned with: (1) Meaningful Learning, which occurs when a student consciously links new knowledge with concepts already known. This is a process of assimilation in which existing ideas are intentionally used as a mechanism for thinking about new knowledge. Assimilation of information occurs in a process termed (2) Integrative Reconciliation, in which the learner is making explicit the similarities and differences between ideas. The process is (3) Active because the learner, while assimilating, is consciously and deliberately judging, reconciling, reformulating, synthesizing, and reorganizing information.

The goal of education, according to Ausubel, is the incorporation of knowledge into (4) Cognitive Structure for long term retention. Cognitive structure is the total content and

organization of an individual's concepts (e.g., all a student knows about contemporary folk music). In order to facilitate the development of cognitive structure Ausubel advocates (5) Receptive Learning, in which the content is presented in its most final and refined form. Ausubel suggests that learning refined and developed knowledge is easier and more efficient because the student doesn't have to create knowledge structures from scratch. However, and very important, receptive learning must be meaningful, which occurs when developed concepts in academic disciplines are actively integrated by teacher and learner with the concepts the learner already knows. In the process of (6) Meaningful Receptive Learning, students reconstruct in their minds an expanding network of increasingly complex concepts. Clarity and stability of these concepts is vital because newly learned concepts then become incorporated into cognitive structure and mediate further learning. An individual matures from a cognitive perspective as he/she acquires more concepts, more higher order concepts and develops a structure indicating relationships between concepts.

In summary, Carlson's and Davis' data suggested at least a problem with student attitudes and at most a breakdown in the professional development process in undergraduate curriculum. One possible, and sometimes suggested, answer would be to declare theory courses irrelevant to the educational needs of preprofessional students and subsequently teach less theory more superficially. In contrast, the Learning Studies faculty intended to teach more in depth the highly specialized Ausubelian learning

theory. Believing that the prime function of good theory is to cut through a morass of opinion and miscellaneous and supposed knowledge, we chose to wade deeper into theoretical waters.

TEACHING AUSUBEL'S CONCEPTS: LEARNING TO LEARN

We knew that teaching Ausubel's theories to college-age sophomores would be tough--from both a motivational and mastery perspective. A nineteen-year old has little conceptual background and, perhaps more importantly, is not accustomed to active and integrative learning processes. From our experience with Ausubel we knew that many of our students would initially go into "learning shock" with the cognitive demands placed on them.

However, Ausubelian theory can be used to learn Ausubel's theory. We hypothesized that early in the course students can be taught elements of Ausubel's theory which, by using Ausubel's theory in practice, they could <u>incorporate meaningfully</u> into their cognitive structures. The meaningful incorporation of early concepts would enable the students to derive a sense of accomplishment by mastering complex concepts--concepts that they in turn would apply to further understanding Ausubel's theory. The process is progressively cumulative, with each new round of theory helping students learn to learn, which in turn would enable students to more powerfully assimilate yet another round of theory at yet a higher level.

The above is what Novak and Gowin (in press) refer to as

metalearning. Metalearning refers to learning that deals with the nature of learning, or learning about learning. Novak's and Gowin's experience with metalearning began with graduate students who recognized that their work with Ausubel's concepts helped them "learn how to learn." Novak and Gowin have taught cognitive learning concepts to younger students explicitly to help them learn how to learn. Early work was done with college students (Cardemone, 1975; Bogden, 1977; Moreira, 1977) and more recent work has been with elementary (Symington & Novak, 1982) and secondary students (Novak & staff, 1981).

Ausubel's work is formidable and the consistency between learning concepts and actual learning is not immediately evident to students. However, we hypothesized that with time, support and plenty of attention to levels of mastery that students would begin to understand the relationship between how they were experiencing learning and understanding concepts.

In order to organize and guide our curriculum and instructional procedures, the following five learning problem areas were identified with supporting rationales. They are:

ORGANIZING RATIONALES

Organizing Learning Problem	Rationale
Retention	(1) Students acquire and retain more in-depth knowledge from a single intense focus versus an extensive or broad focus.
Application and Practice	(2) An intense focus on cognitive learning theory will be better retained and applied in practice than a general learning course which covers a little of every school of thought and approach.
Application and Transfer: Integrating Theories of Cognitive Development with Other Elements of Human Development	(3) Cognitive learning theory provides an excellent framework by which other aspects of development can be conceptualized; understanding intellectual development gives students leverage on their understanding of: educating the whole person, motivation, and classroom dynamics.
Application to an Integrated Curriculum	(4) Cognitive learning theory can be effectively integrated with other education courses (e.g., methods, student teaching) because cognitive learning theory provides a perspective which informs a broad range of educational practices and procedures.
Understanding One's Own Learning Process-- Developing Critical Thinking	(5) Cognitive learning theory will enable students to refine and apply the theory to the development of their own learning and problem solving skills in formal academic settings and informal settings. They will become more effective learners.

The above rationales and principles of learning have been modified over time and their application varies from faculty member to faculty member. However, they have remained basically intact and used by the Learning Studies faculty as guides, ways of thinking which have impacted strongly on every aspect of the teaching and learning process. The problem then is to test the above rationales in an organized fashion in order to determine their validity in light of learning outcomes after three years of practice. More specifically, we needed to know if the rationales and the cognitive based orientation were addressing the aforementioned issues. The second and related problem was to reconstruct and reorganize the original rationales in light of evidence of learning outcomes. Subsequently, Professor Smith made the decision to conduct a systematic and comprehensive review of his sections of Learning and Human Development.

METHOD

The research method used was a modification of content analysis. Traditional content analysis is a systematic examination of written descriptions of experiences by subjects. (See Huberman, M., and Matthew, W., 1982.) After describing an experience (e.g., a course) the subject's writings are then analyzed by using pre-established criteria as a guide for selecting and organizing data. From the data extracted the researcher can make inferences about the meaning that the subject holds toward the topic under investigation. The

researcher then searches for patterns of inferences across the subject population which, if consistent, become valid data. A phenomenon common to many then indicates that the learning environment is stimulating the event. From this point a researcher can make increasingly accurate judgments about the characteristics of the learning environment.

A content analysis approach admits the complexity of an educational setting and thus attempts to maintain validity phenomenologically (Bronfenbrenner, 1976). In order to ensure phenomenological validity, it is important that the data source be freely generated by the subjects, because when students freely choose to address certain concepts and topics they do so because the topic holds a degree of personal meaning to them and has a connection to the world they know. In the case of a course, the data has application to their experience as they understand it. For example, if a student is asked to comment in an open-ended fashion on a learning experience and he or she refers to a concept associated with motivation we can then infer that the concept has been retained in some form and is being applied because motivation is a problem of concern and thus holds meaning for the student. If many students choose to discuss motivation, then it can be inferred, reasonably, that some aspect of the learning experience has established in the students' minds meaningful concepts that pertain to motivation. Thus the data base of this research must show <u>phenomenological validity</u>.

Smith and Stowell modified content analysis by placing a strong emphasis on concepts. This emphasis meant that Researcher Stowell, using her background in cognitive psychology, analyzed descriptions of their learning by scanning for specific concepts that they used.

This enabled Stowell to track how concepts from the course made their way, via the learning experience, through the student's minds to resurface in their writings about the course. Stowell then could compare the original intended concepts with concepts actually learned by individual students. The focus on concepts was important because it helped us assess more accurately actual learnings and retention of specific concepts. Using concept based content analysis we could also study how students reorganized, integrated and applied concepts. The modification of the content analysis technique with an emphasis on concepts not only enabled Researcher Stowell to ascertain if concepts were being retained and used, but further, and more importantly, allowed her to understand how students were actively working with and using concepts. The research method then was useful for data gathering and for evaluating learning outcomes.

Researcher Stowell extracted data by scanning student paragraphs, highlighting pertinent concepts in context with the following criteria.

1. Retention via Naming of Concepts
   Scan student descriptions and select concepts that indicate course concepts retained and applied.

   Example
   "The Readiness Unit was really good I thought--a unifying, piecing together concept at the end of the semester. Assimilation and accommodation and the other principles of the MRL theory I think have concretely opened my ideas to many means of improving our inefficient learning system."

"On the motivation theory I feel that this is the key to active learning, the importance of this lies in the spirit of the learner and the processes he employs. I've found that when I have a class with a (dull) professor, it really puts me to a test. I use the active learning process to increase my motivation, especially if the subject matter appears rote and uninteresting. This enhances my interest in the subject and stimulates my thought processes. I use what's presently in my cognitive structure to help motivate me into MRL and away I go."

2. Application to Learning and Teaching
Scan student descriptions and select concepts that indicate that course concepts have been applied to the subject's learning processes or to thinking about the teaching process.

Examples
"Most significant aspect of this course was the transfer potential to other areas of my life as well as, and most importantly, to my other academic work."

"In EDLS 45 students learn to create an intricate web with their education. They develop the skills necessary to weave their way to a highly productive, stimulating and complete learning experience."

3. Self Awareness
Scan student descriptions and select concepts that indicate that course concepts have been applied to questions of self awareness and self understanding.

Example
"The Identity and Personality Unit really hit me where I needed it. I learned so much about myself. I learned that I had really been a conformist who did not test any values. It wasn't until this unit I realized this. I've also been able to look at things more as 'learning experiences' rather than something I've gained or lost."

4. Attitude Toward Content, Teacher, and Text
Scan student descriptions and select concepts (positive or negative) that indicate the subject's attitude and value of content or teacher or text.

Examples
"Especially significant to me has been the section on motivation, student and teacher personality factors including the concepts of Valence Index, MRL and the practice of democratic classroom and teaching methods."

"I like the philosophical undercurrent. Self-

definition is a preoccupation of my age group and it was in this self-defining that I employed, worked on, the learning theories."

"Not only did Mark teach us the importance of Meaningful Receptive Learning, he also gave us the opportunity to experience such a meaningful learning process."

"The reading came easier once I got used to Ausubel's...jargon."

5. Critical Thinking
Scan student descriptions and select concepts that indicate that the subject is constructing complex explanations of the relationships between concepts--creating novel systheses, inferences, and evaluations.

Examples
"In a changing world such as ours, it is necessary for an individual to be able to step back from the present and look at the many different perspectives to issues. In doing so the learner is using her capacity to reason. This is what liberates us to reach our maximum potential as human beings."

"The extent to which meaningful receptive learning is active depends on the learner's need for integration and criticalness of meaning--how can he develop these abilities/characteristics? He needs to go through discovery learning to develop this.

The above criteria were developed in context with the rationales (see p.), which place a strong emphasis on retention, clarity, application, motivation, transfer and critical thinking. The criteria also reflect the strong emphasis on developing a sense of self awareness, which is consistent with rationale #3.

Researcher Stowell extracted data tfrom student descriptions of their experience. In writing their descriptions, students were guided by the following topic areas: (1) written work, (2) class participation, (3) course content, (4) most significant aspect of the course, (5) recommendations, and (6) personal comments.

RESULTS

The chart below indicates the number of positive statements that were extrapolated from the data base. Researcher Stowell counted the concepts that indicated a positive reaction to specific criteria by individual students. Stowell only counted the criteria area once for each student. She also checked for negative statements--there were few except some on the text and one on the teacher.

The intent in gathering this data was to quantify how many times students, by their own free will, would use concepts in context with the pre-established criteria given an opportunity to comment in an open-ended manner. The higher values are indicative of a criterion which played into account frequently. (For example, see "Self Awareness," 45 #1--23 of 36 students mentioned concepts that indicated a gain in self awareness through the course.) The higher the number, the more frequent the response to a specific criterion area. In contrast, the lower numbers indicate very few comments pertaining to particular criteria. (See 45 #2, "Attitude Toward Text"--only 2 of 23 students mentioned the text, indicating that that criterion didn't maintain itself in students' minds.) The numbers 45 and 46 are the course numbers.

Chart #1

Criterion	45 #1 Fall 1981	45 #2 Fall 1982	45 #3 Fall 1982	46 #1 Spring 1982	46 #2 Fall 1981	Total for all Courses	% of Total	RANK
Concepts	15	10	14	12	16	67	12.5	5
Application to Learning	19	15	16	13	25	88	16.5	2
Application to Teaching	14	11	4	8	13	50	9.4	7
Self Awareness	23	12	12	14	13	74	13.8	3
Attitude Toward Content	16	7	15	14	20	72	13.4	4
Attitude Toward Teacher	21	15	17	16	22	91	17.0	1
Attitude Toward Text	2	2	3	10	9	26	4.9	8
Critical Thinking	15	10	16	7	18	66	12.4	6
COLUMN TOTALS	125	82	97	94	136	534	99.9	
Total # of Students	36	23	27	31	44	161		
Total # of Paragraphs Extrapolated From	92	51	63	72	107	385		

Researcher Stowell was able to rank the different criteria by calculating percentages. The percentage was obtained by dividing the number of responses by the total number of students. From this rank we were then able to assess the relative influence of the original rationales. For example, the rationales stress the importance of application; the rank order below indicates that application to learning out-ranked all other categories.

Chart #2

Criteria	45 #1	45 #2	45 #3	46 #1	46 #2	AVERAGE	Rank
Concepts	.41	.43	.51	.38	.36	.41	5
Application to Learning	.52	.65	.59	.41	.56	.54	1
Application to Teaching	.38	.47	.14	.25	.52	.31	6
Self A.	.63	.52	.44	.45	.52	.46	3
Content	.44	.30	.55	.45	.45	.45	4
Teacher	.58	.65	.62	.51	.50	.50	2
Text	.05	.86	.11	.32	.20	.16	7
Crit. Think.	.41	.43	.59	.22	.40	.41	5
Total # of Students	36	23	27	31	49	161	

DISCUSSION/VALIDITY

This study has three problem areas that effect the validity of the results.

First, the data was extracted from the courses of one instructor. Thus, in analyzing the results it is difficult to determine what is effecting what. Are the resulting outcomes being driven by the teacher, course content, course organization, or elements in the learning process? If the study had been done across multiple teachers then the instructor and learning process variables could be controlled and the effects of the cognitive based curriculum on outcomes could be more accurately tested.

Secondly, this study has a validity problem because Smith is part of the conceptualizing team that redesigned curriculum, then he implements the changes in his own courses and finally designs and carries out with Stowell the research process intended to test and validate the results. Clearly Smith contaminates the validity of

this work by his presence throughout all aspects of this study. To conduct research on one's own teaching is at best a careful exercise in self honesty and at worst an act of self aggrandizement by deception. The work with Learning and Human Development is important to Smith--thus pilot research often begins with those directly involved and committed. Hopefully, in time, a broader base of researchers will become interested in testing the results of Ausubelian learning theory in teacher preparation curriculum. The integrity of the research process was improved substantially because of the fact that Stowell did all the data collecting and organizing.

Finally, and most importantly, this study fails to measure learning outcomes over an extended period. In the introduction the authors indicated the importance of long term retention and application of concepts in teacher education programs and the importance of mastery learning. This investigation does indicate learning outcomes in the short term (e.g., at the conclusion of the course) but fails to measure retention and application in the important areas of student teaching and in actual professional teaching experiences. The innnovations suggested by adopting a cognitive based approach are new to our college, thus we don't yet have a long term student population. In order to critically test Ausubel's theories future research must test concept retention over an extended period. Research can also examine how concepts become reformulated over extended periods.

Keeping in mind the above problems, we do think that the data indicate some interesting results. An analysis follows.

LEARNING HOW TO LEARN

The fact that 54% of the students chose concepts that dealt with the application of the course's content to their own learning is significant. This fact establishes grounds for postulating that students have understood the cognitive learning theory and because of their understanding they have been able to improve their own learning practices, and they know it. This phenomenon is likely the result of the course's strong emphasis on conceptual clarity, the emphasis on building conceptual structures and the consistent use of problem solving strategies which require students to reorganize and rethink the concepts in application.

We think that the generally positive attitudes of the students toward the course and the teacher reflect self satisfaction with their sense of achievement because of more efficient and effective learning. Erik Erikson (1959) theorizes that one of the most powerful drives of late adolescence is a sense of self (identity) derived from industry and competent action. For many college students actively assimilating concepts, integrating concepts and reformulating concepts into new language and patterns is a novel yet exciting experience. The process confirms to them what <u>they can do</u> by thinking. The above inference is further confirmed by White's work on motivation (White, 1959), Flavell on cognitive motivation (Flavell, 1977), and Ausubel, et al., on cognitive drive (Ausubel, et al., 1978).

Further informal confirmation of the learning how to learn thesis occurred during the winter of 1983 when a group of six Learning and Human Development students, on their own initiative, wrote an article for the University's student newspaper (<u>The Vermont</u>

Cynic) on the course. The students were excited about their experience and wanted to share their ideas with peers. Their basic thesis, to quote directly, was: "Students no longer feel detached from the system; courses are no longer separate entities; they all become part of an integrated whole, of which the learners are in command" (Green, 1982, p. 15).

Does learning how to learn mean that our students are learning how to teach? A case can be established for the affirmative. Thirty-one percent of the students developed concepts that relate to an application to teaching, which is probably significant in itself, but is a full 23 points lower than application to learning. The differentiation between teaching and learning makes sense when we consider individuals have alpha capacities (Diggory, 1966), or areas especially relevant to the achievement of major goals. We infer that the alpha capacities of a college age sophomore would be primarily concerned with academic achievement, because the nature of a sophomore's tasks have to do with "doing well" in academic courses. Thus, learning how to learn is development in an alpha area. Later in their college careers (e.g., student teaching) and at the start of their professional lives, learning how to teach will increasingly become an alpha area.

The relationship between learning how to learn and learning how to teach is one that needs further exploration. A working hypothesis could be that concepts which explain how to learn will become the conceptual framework for understanding how to teach when the student's alpha areas shift to teaching. Common sense suggests that students can only develop effective teaching practices after they

have experienced and mastered effective learning practices. At the learning how to teach juncture it will be critical that the students transform cognitive learning theory into cognitive teaching theory. To a certain extent students will make these transfers on their own especially if the concepts remain clear and continue to be useful. However, faculty and programs can augment the transfer to teaching processes with subsequent learning experiences that build from the learning how to learn conceptual base. The above concept is compelling undergraduate faculty at the College of Education and Social Services to tkae a critical look at core curriculum, particularly integrations. We want to ensure that the students' experiences sequentially build upon one another. Students do seem to be developing a solid conceptual framework which they use to think with other areas and there is at least some initial indication, judging from the conceptual complexity of their comments, that a lifelong conceptual framework is beginning to emerge, at least for some. We don't know yet whether Learning Studies students are integrating their knowledge with other courses, but, based on student comments, we do know that students are substantially helped when faculty attempt to integrate the knowledge from one course in a professional sequence with other courses.

The Learning Studies faculty endeavored to do an in-depth treatment of Ausubelian learning theory which appears to be well retained and applied particularly in the area of "learning how to learn." By doing an intense focus have we constricted our students' development in other areas? Have we limited their breadth of perception so as to narrow their considerations of alternatives and opposing points of view? The data tend to suggest that the cognitive

base has become a framework for understanding other aspects of development.

Although we don't have formal data, Researcher Stowell's analysis of the students' writings indicated that many students were incorporating concepts from the learning coursewith concepts from other disciplines (e.g., history). Our inference is that learning Ausubel's concepts have enabled students to think beyond eduational psychology into other disciplines and alternative points of view. For example, a number of students commented on their increased comprehension of behavioral psychology because of the developoment of a solid cognitive-oriented perspective. The case can be made that effective and critical mastery of the cognitive base gives students the stable conceptual framework which ultimately allows them to bridge into new discipline areas or find added meanning in old bodies of knowledge. Learning and applying Ausubelian learning theory appears to contribute to the students' ability to learn how to think--how to think about many aspects of education and learning, other disciplines, and aspects of human development including self development.

Finally, a word about the text used. The data reported herein--confirmed by many informal conversations with students--indicates that students basically value the text's content but have difficulties with comprehension. The text is well organized and in some areas brilliantly written. However students have a problem with the book's readability. Word usage and conceptual organizations employed in the book are hardly common fare to the average 19-year old's academic experiences and conceptual framework.

The selection of texts and other reading material should not necessarily be based on what students like or want, but rather on what they need in view of student potential to conceptually and cognitively develop. In working with Educational Psychology it has been important to encourage students to learn the value of persistently struggling with material that is not at first readily comprehended. (The above is very consistent with many of the major psychological tenets of the text.) Many, but not all, students learn that, like fine wines, critical and meaningful understanding of complex ideas and complex books are the products of time and care. As teachers and students we have learned that there is much that can be done to enable comprehension of difficult material. Clear explanations of the subject matter, good organization, an insistence on precision of thought, opportunities for individualized instruction and plenty of warmth and encouragement are all factors which encourage students to work confusion through to clarity and intllectual achievement. Students learn to be more self-critical and persistent in the process of concept mastery. They also learn to express concepts, checking carefully for feedback. Smith considers the text exciting to teach--often a mutual problem stimlulates substantial interaction and exchange.

Educational Psychology also has a remarkable consistency between its organization and the pedagogic principles in its content. The design of the text in terms of how concepts are sequenced and evolve in an integrated fashion is strongly consistent with cognitive learning theory.

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